Postgraduate Course

Bugs at your service

Fundamentals and application of arthropod-mediated ecosystem services

31 March - 5 April 2019

Parkhotel de Bosrand, Ede, The Netherlands

Postgraduate course organised under the auspices of the C.T. de Wit Graduate School for Production Ecology and Resource Conservation (PE&RC)

The C.T. De Wit Graduate School PE&RC
PRODUCTION ECOLOGY & RESOURCE CONSERVATION

SCOPE OF THE COURSE

Arthropods provide valuable pollination and biocontrol services which are vital for agricultural production, but there is growing concern about the deterioration of these services. This notion has resulted in an increasing interest in management strategies aimed at the conservation of pollinators and natural enemies that provide these services. While there is general consensus that the populations of these service providers can be influenced by the landscape context and management practices at different spatial scales, practical guidelines on spatial planning for Arthropod-Mediated Ecosystem Services (AMES) are often lacking. Moreover, little is known about the possible trade-offs or synergies between interventions to stimulate AMES and other land use functions. In this PhD graduate course we will provide an overview of concepts and tools that can contribute to the design of multifunctional landscapes that are better suited to capitalize on these ecosystem services in conjunction with other land use functions.

The focus of the course will be on:
(1) resource consumer interactions underlying pollination and biocontrol services,
(2) the spatial ecology of pollinators and natural enemies,
(3) the impact of pest management practices on arthropod-mediated ecosystem services, and
(4) the design of multifunctional landscapes that support arthropod-mediated ecosystem services as well as other land use functions.

COURSE SET-UP

The course is composed of a poster session, a series of lectures, model demonstrations, and development of a research proposal in a group setting.

- **Lectures and discussion**

Each day starts with two speakers giving a lecture on one of the key course topics, covering both the general theory and applied aspects. After each lecture, a discussion of 45 minutes is held, which is convened by participants who challenge the speaker on the presentation and papers that the speaker submitted (which participants will receive before the course).

- **Poster session**

Prior to the course, participants must submit a poster of their work (A1-size) in PDF, which will be printed by the course office. The poster must contain your name and affiliation, title and short description of your research project with one highlight (something exciting) and the reason why you want to participate in this course. Participants briefly (3 minutes) highlight the poster followed by ample time for participants and lecturers to visit individual posters. Posters will remain in the lecture room throughout the course.

- **Model demonstrations & R workshop**

State-of-the-art modelling concepts will be demonstrated that relate to the topics covered by the speakers. In a workshop participants will familiarize themselves with some statistical techniques to analyse count data in R.

- **Group activities**

On Tuesday, Wednesday and Thursday afternoon, participants will be split into working groups and will develop a research proposal. Each group will present the results to all course participants on Friday.

Group activities will be supervised by the lecturers and course organizers, so that the students can optimally benefit from experts that are among the leaders in their fields.

SPEAKERS

Doug Landis[1] & David Kleijn[2]
Topic: Resource consumer interactions. Antagonistic (biocontrol) and mutualistic (pollination) resource consumer relationships will be discussed, as well as biotic and abiotic requirements of beneficial arthropods. Management options to enhance AMES will be highlighted.

Catrin Westphal[3]**, Felix Bianchi**[2] **& Wopke van der Werf**[2]
Topic: Spatial ecology of ecosystem service providers. The scale-dependent response of beneficial arthropods to surrounding landscape will be discussed. Considerations for the design of experiments and the use of modeling approaches to study interactions between beneficial arthropods and landscape setting will be reviewed.

David Mortensen[4] **& Eelke Jongejans**[5]
Topic: Pest management and AMES. Relationships between landscape context, pesticide use, and the impact on natural enemy communities will be discussed.

Jeroen Groot[2] **& Felix Bianchi**[2]
Topic: Multifunctional landscape design. Integration of AMES with other land use objectives, such as crop production, landscape aesthetics and water quality, will be discussed. Methods for analysing the trade-offs and synergies between land use objectives will be introduced, and the stakeholder interaction needed for a multi-actor design processes will be examined.

[1] Michigan State University, East Lansing, USA
[2] Wageningen University & Research, Wageningen, The Netherlands
[3] Georg-August university, Göttingen, Germany
[4] Penn State University, Pennsylvania, USA
[5] Radboud University, Nijmegen, The Netherlands

ORGANISERS

- Felix Bianchi (Farming Systems Ecology, Wageningen University & Research)
- Claudius van de Vijver (PE&RC, Wageningen University & Research)
- Lennart Suselbeek (PE&RC, Wageningen University & Research)

PRELIMINARY PROGRAMME

Sunday	***Speaker/moderator***	***activity***	***Topic***
17:00-17:15	Felix Bianchi	Welcome	
17:15-18:00	Marcel Dicke	Presentation	Will follow soon
18:00-18:30		Drinks	
18:30-20:00		Dinner	
20:00-21:30		Poster carousel	

Monday	***Speaker/moderator***	***activity***	***Topic***
08:30-09:30	Doug Landis	Presentation	Antagonistic resource consumer interactions (biocontrol)
09:30-10:00	participants	Discussion	
10:00-10:30		Break	
10:30-11:30	David Kleijn	Presentation	Mutualistic resource consumer interactions (pollination)
11:30-12:00	participants	Discussion	
12:00-13:00		Lunch	
13:00-18:30	Wopke van der Werf/Felix Bianchi	Workshop	Data Analysis in R: analysing count data
19:00-20:00		Dinner	

Tuesday	***Speaker/moderator***	***activity***	***Topic***
08:30-09:30	Catrin Westphal	Presentation	Spatial ecology of ecosystem service providers: experimental approaches
09:30-10:00	participants	Discussion	
10:00-10:30		Break	
10:30-11:30	Felix Bianchi	Presentation	Spatial ecology of ecosystem service providers: modelling approaches
11:30-12:00	participants	Discussion	
12:00-13:00		Lunch	
13:00-14:00	Felix Bianchi	Demo	Population models ladybeetles & parasitoids
14:00-18:00		Proposal writing	
19:00-20:00		Dinner	

Wednesday	***Speaker/moderator***	***activity***	***Topic***
08:30-09:30	David Mortensen	Presentation	Herbicide use and pollination
09:30-10:00	participants	Discussion	
10:00-10:30		Break	
10:30-11:30	Eelke Jongejans	Presentation	Pest management and insect population dynamics
11:30-12:00	participants	Discussion	
12:00-13:00		Lunch	
13:00-14:00	Wopke van der Werf	Demo	Modelling the spatial distribution of ecosystem services using a kernel approach
14:00-18:00		Proposal writing	
19:00-20:00		Dinner	

Thursday	***Speaker/moderator***	***activity***	***Topic***
08:30-09:30	Jeroen Groot	Presentation	Multifunctional landscape design: synergies and trade-offs
09:30-10:00	participants	Discussion	
10:00-10:30		Break	
10:30-11:30	Felix Bianchi	Learning game	Multifunctional landscape design: multi-actor design processes
11:30-12:00	participants	Discussion	
12:00-13:00		Lunch	
13:00-14:00	Jeroen Groot	Demo	Landscape IMAGES
14:00-18:00		Proposal writing	
19:00-20:00		Dinner	

Friday	***Speaker/moderator***	***activity***	***Topic***
08:30-10:00	participants	Presentation	Presentations of group work projects
10:00-10:30		Break	
10:30-12:00	participants	Presentation	Presentations of group work projects
12:00-13:00		Lunch	
13:00-14:00		Goodbye	

Activity types:

	Lectures & discussion	Speakers will prepare 45 min lectures. Participants that convene discussion have read key papers of speakers of the session they are asked to moderate the discussion
	Demonstrations & R workshop	Demonstration of some statistical techniques and modelling tools in a lecture setting. In a workshop participants can familiarize themselves with data analysis in R.
	Proposal writing	Participants write proposal in groups. Regular informal reporting to entire group during the various stages of the proposal development (e.g. brainstorm results, title, research questions, methods, innovative aspects). Final presentation on Friday.